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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/086,150	10/22/2001	Robert William Bruce	13DV13861	4142

31316 7590 01/22/2003

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EXAMINER

MCNEIL, JENNIFER C

ART UNIT	PAPER NUMBER
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1775

DATE MAILED: 01/22/2003

4

Please find below and/or attached an Office communication concerning this application or proceeding.

AS-4

Office Action Summary

Application No.

10/086,150

Applicant(s)

BRUCE ET AL.

Examiner

Jennifer McNeil

Art Unit

1775

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 August 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10/22/01 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2. 6) ☐ Other:

DETAILED ACTION

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the 'right to exclude' granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-13, and 17-21 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-15 of copending Application No. 09/957,843 filed 09/21/01 (attorney docketed 13DV13838). Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims offer overlapping choices for the sintering inhibitor. The instant claims correspond to the claims of Application 09/957,843 as follows:

Instant Application	Copending Application
1, 11-13	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
17	11
18	12
19	13
20	14
21	15

The claims are essentially identical except for the Markush grouping for the sintering inhibitor. The copending application includes the choices of lanthanum oxide, chromium oxide, yttrium chromate, and mixtures thereof with aluminum oxide. Each of these choices is present in the instant claims, and it would have been obvious to one of ordinary skill in the art at the time of the invention to select one of the choices that are presented in the claims.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is not clear whether applicant intends to claim the intermediate or final product of the thermal barrier coating.

The claims (claims 1, 15, and 17) are to a thermal barrier coating having a sintering inhibitor within the grains in the form of an oxide, chromate, mixtures thereof, mixtures thereof with aluminum oxide, modifications thereof with cobalt or manganese, precursors thereof, and reaction products thereof. Is applicant intending to claim an intermediate or a final product with regard to the precursors? Is an extra step needed for the precursor of the sintering aid to be formed? In other words, does the precursor have sintering inhibitor capabilities or is it only effective after being converted to its final form?

Claim 11 refers to "a form of a sintering inhibitor within the columnar grains, the form of the sintering inhibitor being selected from the group consisting of lanthanum oxide, lanthanum chromate, chromium oxide, and mixtures thereof". Claims 12-15 provide additional forms that the sintering inhibitor may take, but these are not included in the alternative grouping of the independent claim. The

Art Unit: 1775

specification defines "form" as including these additional compounds, but the independent claim limits the choices to the four compounds named above, thereby eliminating the others disclosed in the specification. If all of the compounds defined in the specification are to be claimed, the independent claim should reflect each choice.

Claim 14 is not clear. Is the modification with cobalt or manganese an alternative for each compound in addition to the compound itself, or is it intended that each compound be modified? In other words, does the group consist of the compounds modified with cobalt or manganese?

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-8, 10-12, 17, 18, and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Marijnissen et al (US 5,876,860). Marijnissen et al teach a thermal barrier coating ceramic structure including a superalloy substrate (36), a bond coat (38), and a ceramic topcoat (44). The ceramic topcoat has columnar grains (48) and the composition may include zirconia stabilized with yttria, lanthanum oxide, or mixtures thereof (col. 5, lines 6-17). It is the position of the examiner that the mixture of yttria and lanthanum oxide meets the limitation of the claims, and the lanthanum oxide would perform the function of a sintering inhibitor.

Regarding claim 2, the substrate may be a nickel superalloy (col. 7, lines 30-33).

Regarding claims 3 and 4, the substrate may be a hot section component of a turbine engine, such as a vane (col. 6, line 58- col. 7, line 20).

Regarding claims 5 and 15, as discussed above, a bond coat is disposed between the substrate and ceramic coating.

Art Unit: 1775

Regarding claims 6 and 7, the bond coat may be a diffusion aluminide, such as platinum aluminide (col. 2, lines 20-67; col. 7, lines 41-67; col. 14, lines 38-41).

Regarding claim 8, the thermal barrier coating comprises YSZ (col. 5, lines 6-17).

Regarding claim 10, it is the examiner's position that a mixture of zirconia with yttria and lanthanum oxide applied by the methods of Marijnissen would produce a coating with the oxides evenly dispersed.

Regarding claim 18, the oxides are applied by EB-PVD, and from only one source of ceramic coating (col. 14, lines 37-50).

(e) the invention was described in-

- (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or
- (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

Claims 1-13, and 15-21 are provisionally rejected under 35 U.S.C. 102(e) as being anticipated by copending Application No. 09/957,843 (filed 09/21/01) which has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the copending application, it would constitute prior art under 35 U.S.C. 102(e), if published under 35 U.S.C. 122(b) or patented. This provisional rejection under 35 U.S.C. 102(e) is based upon a presumption of future publication or patenting of the copending application.

This provisional rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the copending application was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131. This rejection may not be overcome by the filing of a terminal disclaimer. See *In re Bartfeld*, 925 F.2d 1450, 17 USPQ2d 1885 (Fed. Cir. 1991).

The prior application to Ackerman essentially claims the same subject matter of the claims of the instant application. Specifically, Ackerman teaches an article having a substrate, a thermal barrier coating comprising a plurality of columnar grains generally perpendicular to the substrate surface and a sintering inhibitor within the columnar grains. The sintering inhibitor may be lanthanum oxide, chromium oxide, and yttrium chromate, mixtures thereof, and mixtures with aluminum oxide. The method disclosed by Ackerman includes all of the limitations of the instant claims including co-deposition, and infiltration with a solution. Regarding claims 15 and 16, the specification of the copending application teaches that the sintering inhibitor may be a reaction product of the thermal barrier ceramic and an inhibitor precursor oxide. Examples of the precursor include lanthanum, for lanthanum oxide, and reaction products may include lanthanum oxide reacted with zirconia (paragraphs 32-34 of copending application).

Claims 1-6, 8, 10-13, 16-18, and 21 are rejected under 35 U.S.C. 102(e) as being anticipated by Heimberg et al (US 6,440,575). Heimberg et al teach a ceramic thermal barrier layer for a gas engine component. The component includes substrate (1), adhesion promotion layer (bond coat) (2), and columnar ceramic coating (4). The ceramic thermal barrier layer includes a mixed metal oxide system comprising a compound such as lanthanum aluminate. The ceramic layer is produced by applying a mixture of metal oxides to the substrate. The mixed metal oxide system preferably contains lanthanum aluminate, and the lanthanum may be partially replaced by gadolinium, and the mixture may also include aluminum oxide, zirconium oxide, and yttrium oxide (col. 4, lines 17-26; col. 5, lines 16-34). The reaction of these oxides does not take place until during the coating process, namely directly after the arrival on the product (col. 7, lines 34-45). Therefore, the unreacted oxides, including lanthanum oxide, zirconium oxide, aluminum oxide, and yttrium oxide, are present in the coating for a time.

Regarding claim 2, the substrate may be a nickel superalloy (col. 3, line 65-col. 4, line 1).

Regarding claims 3 and 4, the coating is for a turbine engine component such as a vane or blade (col. 7, lines 45-50).

Art Unit: 1775

Regarding claims 5, 6, and 21, the adhesion layer may be a MCrAlY coating (col. 4, lines 12-16; col. 7, lines 1-14).

Regarding claims 8 and 13, zirconium oxide and aluminum oxide may be present in the coating (col. 6, lines 60-64).

Regarding claim 16, in the final product of the article, the reacted oxides include lanthanum oxide.

Regarding claims 10 and 18, it is the examiner's position that a mixture of the oxides applied by the methods of Heimberg would produce a coating with the oxides evenly dispersed.

Claims 1-6, 8, 9, 11-13, 16, 17, and 19-21 are rejected under 35 U.S.C. 102(e) as being anticipated by Subramanian (US 6,296,954). Subramanian teaches a columnar thermal barrier coating with a sheath of a heat resistant ceramic thereon. The sheath is a reaction product of a precursor ceramic oxide material and the base material of the thermal barrier coating. The coating is applied to a substrate (22), which may have a bond coating (24). The thermal barrier ceramic may be a mixed oxide of Al, Ca, Mg, Zr, Y, Sc, and rare earth elements, such as La, and the sheath coating is an oxide which may also comprise any of these elements (col. 5, lines 34-49). The sheath is deposited as an overlay coating on the columnar ceramic and then heated. The sheath then infiltrates the thermal barrier ceramic (col. 5, lines 50-67). These overlay coatings may be applied via air plasma spray, chemical vapor deposition, and sol-gel techniques (col. 6, lines 8-11). Specifically, Subramanian teaches that the preferred ceramic material is a rare-earth stabilized zirconia and a sheath of aluminum oxide. The rare-earth metals include lanthanum (col. 2, lines 60-67; col. 5, lines 35-40).

Regarding claim 2, the substrate may be a nickel superalloy (col. 3, lines 60-65).

Regarding claims 3 and 4, the thermal barrier coating is for turbine engine components such as vanes (col. 4, lines 1-7).

Regarding claims 5, 6, and 21, the bond coat may be a MCrAlY layer (col. 4, lines 8-20).

Art Unit: 1775

Regarding claims 8 and 13, as discussed above, zirconia is one of the oxides, and the sheath is formed of aluminum oxide.

Regarding claims 9, 11, and 19, the sheath is applied to the columnar grains of the ceramic layer, and infiltrates the grains to a certain depth; therefore, the concentration is higher at the grain surfaces (col. 5, lines 50-60).

Regarding claim 16, as stated above, the sheath is a reaction product of the thermal barrier ceramic and a precursor ceramic oxide, therefore the rare earth oxide (lanthanum oxide) contributes to the reaction product.

Regarding claim 20, the sheath may be applied by sol-gel.

(f) he did not himself invent the subject matter sought to be patented.

Claims 1-13, and 17-21 are rejected under 35 U.S.C. 102(f) because the applicant did not invent the claimed subject matter. Claims 1-21 of the instant application are commensurate with copending and commonly assigned application 09/957,843. As explained above, the inventions are identical where the alternative groupings overlap. The copending case has the following named inventors: John Ackerman, Venkat Venkataramani, Irene Spitsberg, and Ramgopal Darolia. The instant application has the following named inventors: Robert Bruce, and Nicholas Burlingame. It is not clear how two applications with corresponding claims have no common inventor.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Heimberg et al (US 6,440,575) in view of Marijnissen et al (US 5,876,860). Heimberg teaches a ceramic thermal barrier layer for a gas engine component, discussed above. The component includes substrate (1), adhesion promotion layer (bond coat) (2), and columnar ceramic coating (4). The ceramic thermal barrier layer includes a mixed metal oxide system comprising a compound such as lanthanum aluminate. Heimberg teaches a bond coat comprising a MCrAlY-type aluminide, but does not specifically teach a platinum aluminide.

Marijnissen et al teach a thermal barrier coating ceramic structure including a superalloy substrate (36), a bond coat (38), and a ceramic topcoat (44), discussed above. The ceramic topcoat has columnar grains (48) and the composition may include zirconia stabilized with yttria, lanthanum oxide, or mixtures thereof (col. 5, lines 6-17). The bond coat described by Marijnissen may be MCrAlY, or platinum aluminide. Marijnissen teaches that these aluminide coatings are known to be useful coatings for protecting nickel base alloys and as bond coatings in thermal barrier systems. As it is taught by Marijnissen that platinum aluminides are known in the art to be useful as bond coatings and are protective for nickel alloys, it would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the platinum aluminide of Marijnissen for the MCrAlY of Heimberg to provide increased protection to the underlying nickel alloy substrate.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Subramanian (US 6,296,945) in view of Marijnissen et al (US 5,876,860). Subramanian teaches a columnar thermal barrier coating with a sheath of a heat resistant ceramic thereon, discussed above. The sheath is a reaction product of a precursor ceramic oxide material and the base material of the thermal barrier coating. The coating is applied to a substrate (22), which may have a bond coating (24). Subramanian teaches that the bond coat may be a MCrAlY layer, but does not specifically teach a platinum aluminide bond coating.

Art Unit: 1775

Marijnissen et al teach a thermal barrier coating ceramic structure including a superalloy substrate (36), a bond coat (38), and a ceramic topcoat (44), discussed above. The ceramic topcoat has columnar grains (48) and the composition may include zirconia stabilized with yttria, lanthanum oxide, or mixtures thereof (col. 5, lines 6-17). The bond coat described by Marijnissen may be MCrAlY, or platinum aluminide. Marijnissen teaches that these aluminide coatings are known to be useful coatings for protecting nickel base alloys and as bond coatings in thermal barrier systems. As it is taught by Marijnissen that platinum aluminides are known in the art to be useful as bond coatings and are protective for nickel alloys, it would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the platinum aluminide of Marijnissen for the MCrAlY of Subramanian to provide increased protection to the underlying nickel alloy substrate.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer McNeil whose telephone number is 703-305-0553. The examiner can normally be reached on Monday through Friday, 9:30AM-6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on 703-308-3822. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Jennifer McNeil
Examiner
Art Unit 1775



JCM

January 15, 2003